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at present recorded in several differing European languages; and

WHEREAS the diversity of tongues is a continuing hindrance to interchange of knowledge and literatures, seriously enhancing the cost and labor of studious pursuits, which might in large measure be avoided by the adoption by the civilized nations of an Alternate Language of Learning, Law and Commerce, and as such required to be taught in higher schools (in combination with the mother tongue) and used in interlingual correspondence and printed records; and

WHEREAS it is believed this need is felt and acknowledged by societies and corporations of several nations and awaits the initiative of some one of them to propose concerted action thereon; now, therefore, be it

Resolved, That whenever the President or Permanent Secretary of the Association shall have received from similar bodies, or from universities of Europe, expressions sufficient in number to represent a majority of the maritime peoples, signifying a desire to cooperate in an International Conference of Languages, it shall be his duty to lay the same before the Council at the next regular, or, if need be, at a specially-called, meeting, with the view to the appointment of one or more delegates to represent American Pedagogy and Science thereat, at some convenient time and place in central Europe.

In like manner the Permanent Secretary is hereby authorized to acknowledge, on behalf of this Association, receipt of such invitation for a like purpose emanating from any government, or department thereof, Institution of Learning, Technical Science, Chamber of Commerce or Finance, Telegraphic or Transportation Bureau, Postal Union or Academy of Arts and Letters, and to pledge the further attention of this Council to the same.

GEOLOGY AND GEOGRAPHY AT THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

PROFESSOR I. C. WHITE, Chairman of the Section, being in attendance upon the International Geological Congress in Russia, the Council filled the vacancy by the election of Professor E. W. Claypole, who read Professor White's address and presided over the meetings of the Section.

After the presentation of the vice-presidential address, the following papers were read:

1. 'The Geological Age and Fauna of the Huerfano Basin, in Southern Colorado,' by Professor H. F. Osborn, New York.

The author reviewed the work of R. C. Hills, and concluded from recent field work that the Huerfano Lake deposits are from 800-1000 thick, consisting of upper beds equivalent to Bridger, and lower beds equivalent to Wind River and Wasatch. Below them is an unconformable series, probably Cretaceous. The distribution of deposits indicates a different extension of the lake from that given by Hills. Brief reference was made to the fossils found.

2. 'Lake Chicago and the Chicago Outlet,' by Frank Leverett, Denmark, Iowa. The paper discussed, in detail and with abundant data, the beaches and outlet of Lake Chicago, a glacial lake having southward discharge from the southern end of Lake Michigan basin, through the Des Plaines and Illinois rivers to the Mississippi.

3. 'Some Features of the Recent Geology Around Detroit,' by Frank B. Taylor, Fort Wayne, Ind. Detroit is built on moraines deposited under 200 feet of water. While the ice front was here the western half of Erie basin was filled by a glacial lake. This gives a very smooth surface contour. Shore lines and beaches are well developed. The lower courses of old tributaries of Detroit river are drowned. Streams two miles long have deep estuaries, much deeper than they could erode under present conditions, *e. g.*, Rouge River and Baby Creek. Rouge River, four miles above its mouth, has an average mid-stream depth of from 20 to 30 feet, four times deeper than would be expected from the stream's own erosion. The same is true of the St. Clair tributaries. The succession of events has been as follows: The rivers first flowed as now, but slightly higher. Then, while the upper lakes drained to the Ottawa, abandoning the St. Clair and Detroit Rivers, the streams were cutting to a base level from 25 to 30 feet lower than present river surface. Finally, a north-east uplift established existing conditions

and the refilled Detroit and St. Clair backed up into the deepened tributaries. This confirms the previously supposed temporary drainage of the upper lakes to the Ottawa.

4. 'The Lower Abandoned Beaches of Southeastern Michigan,' by Frank B. Taylor, Fort Wayne, Ind. The paper described the characteristic features, altitudes and deformations of the beaches, and showed that there are at least four important beaches at the south end of Lake Huron, below the Forest Beach of Lake Warren. Two of them, the Elkton and Algonquin, probably extend as far south as Detroit, though not yet traced to this place. The Nipissing beach is supposed to pass under Lake Huron at the south end.

5. 'Recent Earth Movement in the Great Lake Region,' by G. K. Gilbert, Washington, D. C. A comparison of gauge records and bench marks, representing a period of about twenty years, shows that, in the lake region, the land is being tilted from northeast to southwest. The rate is such that of two points one hundred miles apart the northern rises five inches with reference to the southern, in a century. At Chicago the mean lake level is rising at the rate of one inch in ten years. On account of the slight elevation of the divide between Lake Michigan and the Illinois River, a comparatively small tilting of the region will establish an outlet in this direction. It is estimated that, in about three thousand years, all of the upper lakes will discharge into the Illinois River, the current of the Detroit and St. Clair Rivers will be reversed, carrying the water of Lake Erie into Lake Huron, and the Niagara River will run dry.

6. 'A Supplementary Hypothesis of the Origin of the Loess of the Mississippi Valley,' by Professor T. C. Chamberlin, Chicago, Ill. The paper opens by a statement of two great features of the distribution of the loess of the Mississippi Valley which

are significant of its origin: (1) The loess is distributed along the leading valleys; (2) it is distributed along the border of the former ice sheet at the stage known as Iowan. These two features indicate the relationship of the loess to the great drainage valleys and to the ice sheet. Nevertheless, the vertical distribution of the loess and the presence of land shells offer great difficulties in the way of accepting the pure aqueous theory. After sketching these difficulties the paper proceeds to offer a hypothesis, which divides the honors between the aqueous and the Eolian agencies. Recognizing the strength of the arguments in favor of a glacio-fluvial origin, it postulates the limitation of the aqueous loess to the lower levels and assumes that the oscillations in the flood stages gave rise to broad, exposed flats, which when dry would be swept by the winds and the dust derived, carried to and lodged upon the uplands, giving rise to an eolian phase of the loess. The paper proceeds to discuss the necessary accommodation between the extent of the aqueous and the fluvial depositions and to compare the combined hypothesis presented with that of Richtofen.

7. 'An Account of the Researches relating to the Great Lakes,' by Dr. J. W. Spencer, Washington, D. C. The author presented an exhaustive review of the gradual development of our knowledge of the Great Lakes, stating the various opinions that have been, and are now, held in regard to their origin, changes and probable future. Being in itself largely a summary, the paper scarcely admits of condensation to the limits of a brief abstract.

8. 'Changes of Level in the Glacial Formations of the Alps,' by Professor Albrecht Penck, Vienna, Austria. The deposits belonging to the glacial period of the Alps must, as to their origin, be divided into true moraine and fluvio-glacial. The moraine deposits occur everywhere where glaciers

have existed, and are not confined to certain levels. The fluvio-glacial gravels, as river deposits, must have had originally a slope in the direction in which the river flowed. This slope has been in some places destroyed by earth movements. This can be shown in the best way by following the oldest of the three fluvio-glacial deposits, the high-level gravel. It formed originally an extensive covering of the low ground of the north Alpine Piedmont region, sloping to the north. Now it forms a series of very flat folds which run parallel to the foot of the western Alps. These folds can be followed from the mouth of the Aar into the Rhine, and from the mouth of the Lech into the Danube, a distance of 250 miles.

The earth movements of the glacial period in the Alps are of a different type from those about the grand American lakes. The American belong to a warping of the earth's crust, which is independent of structural lines; the sub-Alpine shows that the folding of the Alpine system was still going on in early glacial times in the foreland. Whether or not this folding was connected, as Heim assumes, with a bodily sinking of a whole mountain chain, could not be ascertained.

9. 'A Suggestion in Regard to the Theory of Volcanoes,' by Professor W. N. Rice, Middletown, Conn. The distribution of volcanoes gives a clue to their cause. As a generalization, it may be stated that volcanoes occur in localities where there has been recent elevation. Assuming the interior of the earth to be potentially liquid, relief of pressure by crustal uplift might cause fusion, the fused material finding exit by fissures produced during the movement. This idea has been suggested before, but seems deserving of the more explicit formulation presented in this paper. To the objection that contemporaneous sheets of igneous rocks occur in thick masses of sediment, indicating subsidence, it may be

answered either that igneous rocks come from adjacent rising areas or that they point to oscillation of movement, progressive subsidence being interrupted by epochs of elevation.

10. 'The Ores and Minerals of Cripple Creek,' by H. P. Parmelee, Charlevoix, Mich. After a short review of the rocks and ores of the region, the important minerals were mentioned, and some described in detail. Specimens of several species were shown, among them a very perfect crystal of calaverite.

11. 'Observations on the Genus *Barrettia*,' by Professor R. P. Whitfield, New York. The author referred to the original discovery of the fossils and description of the genus by S. P. Woodward, with its reference to the *Rudistidæ*; he then pointed out several peculiar features of the fossils not noticed in the original description and called attention to their strong resemblance to cup corals, and their general radiate structure. The description was based upon a large collection of specimens obtained from Jamaica, W. I.

12. 'Ice Jams and what they Accomplish,' by Dr. M. A. Veeder, Lyons, N. Y. The paper dealt with the effect of ice forced through river channels, partly floated and partly grounded on the land through choking of the outlets of lakes. The channeling of rock surfaces in the St. Lawrence valley and the formation of parallel ridges in Salina marls and shales were ascribed to this action.

13. 'The Lower Carboniferous of Huron County, Michigan,' by Dr. A. C. Lane, Houghton, Mich. This paper, read by Mr. W. F. Cooper, described the Bayport limestone, the Michigan salt group and the Marshall series, as exposed along the 'Thumb' of the Lower Peninsula. The localities were arranged in their proper position in the geological column, and it was shown that the rocks have a greater

thickness than was formerly supposed. Preglacial stream valleys were also treated.

In the absence of the authors the following papers were read by title:

14. 'Progress of Hydrographic Investigations by the United States Geological Survey,' by F. H. Newell, Washington, D. C.

15. 'Stylolites,' by Professor T. C. Hopkins, State College, Pennsylvania.

Tuesday was given to the Geological Society, and Wednesday afternoon the Section met with Section H, joining in the discussion of the human relics found in the Trenton gravel.

C. H. SMYTH, JR.

HAMILTON COLLEGE.

GEOLOGICAL SOCIETY OF AMERICA.

THE ninth summer meeting of the Society was held at Detroit, August 10th, under the presidency of Professor Edward Orton.

The Secretary announced the election of nine fellows.

The following papers were read:

1. 'The Granite Mountain Area of Burnet County, Texas,' by F. W. Simonds. The area described embraces about fifty square miles, from which the overlying strata have been removed, and the granite reduced to a plain, except at Granite Mountain and Johnson's Rock, which rise about one hundred feet above the general surface. The granite is a biotite granite and is quarried on a considerable scale, affording an excellent building material. After reviewing the opinions of Walcott, Hill and Comstock in regard to the age of the granite, the author concluded that the intrusion accompanied post-Carboniferous disturbances, and may have been as late as Cretaceous.

2. 'Stratigraphy and Structure of the Puget Group, Washington,' by Bailey Willis. The Eocene and Miocene strata adjacent to Seattle and Tacoma are folded and faulted in a manner closely analogous

to that of the Appalachian region, but the compressing force acted from the west instead of the east. The fresh-water Eocene is much like the eastern Carboniferous, consisting of arkose sandstones and clay shales containing iron carbonate nodules, with beds of coal or black shale every one hundred, to one hundred and thirty, feet. The total thickness exceeds eight thousand feet. When slightly disturbed, the coal is lignite, but as the amount of disturbance increases there is a passage into steam coal with cubical fracture, and, finally, into coking coals. The coals, being planes of easy slipping, have greatly affected the folding, and have themselves often been crushed to powder.

3. 'The Loess as a Land Deposit,' by J. A. Udden. Observation indicates that the air is not depositing dust in sufficient quantities to build the loess, which spreads over such great areas, at elevations ranging from 300 to 3,000 feet. But the amount deposited varies greatly and may have been much larger in early post-glacial times. The loess closely resembles undoubted wind-blown deposits, while in its uniformity and prevailing lack of bedding plains it is quite different from most aqueous sediments. On the whole, the actual phenomena exhibited by the loess seem to accord better with the hypothesis of Eolian origin than with any other.

4. 'Analogy between Declivities of Land and Submarine Valleys,' by J. W. Spencer. With the aid of diagrams, the author pointed out the close resemblance existing between subaërial and submarine valleys, particularly in the Antillean region. He concluded that such similarity of topography must indicate a common origin, and that the present sea bottom must be a submerged land surface. This shows a sinking of ten to fifteen thousand feet in the Antillean basin, which was probably compensated by an elevation in the region of Mexico.